

REMARKS

Claim 1 has been amended. Claims 1-2 and 5-10 are present in the application. In view of the foregoing amendments, and the remarks that follow, Applicants respectfully request reconsideration.

Premature Finality

Applicants respectfully traverse the finality of the Office Action. In the Office Action, Sections 1-6 on pages 2-7 present claim rejections under 35 U.S.C. §102 and §103 that are identical to claim rejections set forth in the most recent prior Office Action (mailed January 24, 2007). These claim rejections have defects, as discussed in the remarks of Applicants' last Response (filed March 8, 2007). In the present Office Action, Section 7 on pages 7-12 contains more than four pages of new discussion that was not present in the last Office Action, and that effectively modifies the claim rejections in Sections 1-6 so as to cure defects therein. By way of example and not limitation:

1. Section 1 of the Office Action presents a §102 rejection that is improperly based on at least three different embodiments in Yeh U.S. Patent No. 6,207,565. Section 7 attempts to cure this defect by indicating that the rejection was intended to be based specifically on the embodiment of Figure 9 in Yeh. Thus, the §102 rejection in Section 1 is modified by the discussion in Section 7 and, since the discussion of Section 7 was not present in the most recent prior Office Action, this constitutes a new ground of §102 rejection.
2. In addition to the §102 rejection presented in Section 1 of the Office Action, Sections 2-6 present rejections under 35 U.S.C. §103 that are each based partly on Yeh. As to each of these §102 and §103 rejections, Section 7 presents an extended discussion of Figures 6 and 9 of Yeh that seeks to fill in gaps in the

explanations of the §102 and §103 rejections in Sections 1-6. In effect, the §102 and §103 rejections in Sections 1-6 are modified by the discussion in Section 7. Since the discussion of Section 7 was not present in the most recent prior Office Action, this means that each of the §102 and §103 rejections constitutes a new ground of rejection.

MPEP 706.07(a) specifies that an Office Action shall not be final "where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement" (IDS). Although Section 7 of the Office Action purports to be merely a response to the arguments in Applicants' last Response, Section 7 goes well beyond merely responding to Applicants' arguments, and in particular offers a discussion that has the effect of supplementing and modifying each of the §102 and §103 claim rejections set forth in Sections 1-6. Since Section 7 was not present in the most recent prior Office Action, Sections 1-7 of the present office Action collectively set forth new grounds of rejection under §102 and §103. During the time interval between issuance of the January 24 Office Action and issuance of the June 1 Office Action, Applicants did not amend the claims or file an information disclosure statement. Therefore, in the words of MPEP §706.07(a), this is a situation "where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement". Accordingly, it is respectfully submitted that the finality of the present Office Action is not proper and must be withdrawn, and notice to that effect is respectfully requested.

Comment Regarding Amendment to Claim 1

As previously presented, Claim 1 included a recitation in step (b) of "cleaning a residue from said opening", and then a recitation in step (c) of "etching said cleaned opening in said substrate". To the extent step (c) referred to the "cleaned" opening, step (c) was indicating that

the cleaning away of residue had already been completed. As noted above, Section 7 of the present Office Action offers a lengthy discussion that has the effect of modifying the §102 and §103 claims rejections. As part of this, Section 7 repeatedly asserts that step (c) of Claim 1 is met by selected portions of the Yeh patent (including steps 4 and 5 in Figure 6 and block 908 in Figure 9). However, the indicated portions of Yeh actually deal with a technique for cleaning a residue away. These portions of Yeh are thus not equivalent to step (c) of Claim 1, because they deal with cleaning away a residue, whereas step (c) refers to a "cleaned" opening to indicate that the cleaning of residue has already been completed and that something different is going on.

Claim 1 was thus already distinct from the applied art, for reasons discussed in the remarks of Applicants' last Response. Further, it will be noted that, even after the foregoing amendment to Claim 1, step (c) continues to refer to the "cleaned opening". Therefore, Claim 1 continues to be distinct from the applied art, for a reason that previously rendered Claim 1 distinct from the applied art.

In addition, the foregoing amendment adjusts the language of step (c) slightly, in order to more clearly reflect the fact that step (c) was intended all along to recite something that happens after the opening has been "cleaned", namely the etching of some portion of the substrate through the "cleaned" opening. Applicants' prior arguments have emphasized this. Further, dependent Claims 9 and 10 have reflected this on a more specific level since filing of the present application. The adjustment to Claim 1 thus does not introduce any "new issue", because it does not change the intended scope of step (c), and because it does not involve anything that has not already been thoroughly searched and considered in association with one or more of Claims 1, 9 and 10.

Independent Claim 1 -- §102 and Yeh

Independent Claim 1 stands rejected under 35 U.S.C. §102 as anticipated by Yeh U.S. Patent No. 6,207,565. This ground of rejection is respectfully traversed, for the following reasons.

UNDER §102, ALL CLAIM ELEMENTS MUST BE PRESENT IN ONE EMBODIMENT

If a reference discloses multiple embodiments, then in order to anticipate a claim under §102, the elements in the claim must all be present in one of the disclosed embodiments. In more detail, MPEP §2131 specifies that, under §102, each and every element of a claim must be found in a single prior art reference, and also specifies that "The elements must be arranged as required by the claim". As discussed in detail in the remarks of Applicants' last Response, this PTO requirement in MPEP §2131 reflects (1) decisions by the courts (including *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990), citing *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481, 485 (Fed.Cir. 1984), citing *Connell v. Sears Roebuck & Co.*, 220 USPQ 193 (Fed.Cir. 1983)), and (2) decisions by the PTO Board of Appeals (including *Ex parte Gould*, 6 USPQ2d 1680, (Bd.Pat.App. & Int'f. 1987)).

For reasons that are discussed in detail in the remarks of Applicants' last Response, the §102 rejection in Section 1 of the present Office Action improperly extracts isolated elements from at least three different embodiments disclosed in Yeh, including (1) the "Background " section in column 1 where Yeh discusses a pre-existing embodiment that is not part of Yeh's invention, (2) Figures 1-8 where Yeh discloses a first embodiment of his invention, and (3) Figure 9 where Yeh discloses a second embodiment of his invention. As noted earlier, Section 7 of the Office Action attempts to clarify this rejection and cure this defect by stating that this §102 rejection should be considered to be based only on the embodiment shown in Figure 9. Applicants accept this clarification, subject to the understanding that it makes the §102 rejection in the present Office Action a new ground of rejection that renders the finality of the present Office Action improper.

YEH DOES NOT DISCLOSE ALL ELEMENTS RECITED IN CLAIM 1

In any event, even the new ground of §102 rejection set forth in the present Office Action does not actually anticipate Claim 1. More specifically, as mentioned above, the PTO specifies in

MPEP §2131 that, in order for a reference to anticipate a claim under §102, the reference must teach each and every element recited in the claim, and those elements must all be arranged as recited in the claim. In the present situation, Yeh does not disclose all of the elements that are recited in Claim 1. In this regard, Claim 1 recites:

- (a) performing an oxygen ashing step to remove said patterned photoresist layer;
 - (b) cleaning a residue from said opening by performing a halogen containing plasma step; and
 - (c) etching said substrate through said cleaned opening;
- wherein steps (a), (b), and (c) are performed in the same process chamber of said etching tool.

The new information in Section 7 of the present Office Action indicates that the §102 rejection of Claim 1 is based solely on the embodiment shown in Figure 9 of Yeh. In Figure 9, block 904 shows an oxygen ashing step that Yeh carries out in order to remove the photoresist shown at 208 in Figure 3. The new information in Section 7 of the Office Action also indicates that block 904 is considered comparable to step (a) in Applicants' Claim 1. In Figure 9 of Yeh, after the photoresist has been removed in block 904, Yeh proceeds to blocks 906 and 908. The new information in Section 7 of the Office Action asserts that blocks 906 and 908 respectively correspond to steps (b) and (c) in Applicants' Claim 1. However, block 908 in Figure 9 of Yeh involves cleaning away a residue, whereas step (c) of Claim 1 explicitly refers to "said cleaned opening" to indicate that cleaning has already been completed, and that something else is happening. Further, step (c) specifies that what is happening is "etching said substrate through said cleaned opening". In contrast, the procedure in block 908 in Figure 9 merely cleans away a residue, without etching any part of Yeh's substrate, much less through a cleaned opening. Moreover, after the cleaning away of residue in blocks 906 and 908 is completed, what Yeh goes

on to do next is form a silicide, not etch the substrate. Thus, the embodiment shown in Figure 9 of Yeh does not disclose each and every element that is recited in Claim 1. Figure 9 of Yeh therefore does not anticipate Claim 1 under §102.

A further and separate consideration is that, since Figure 9 fails to disclose an etching process comparable to step (c) of Claim 1, the embodiment of Figure 9 also necessarily fails to teach or suggest that a single process chamber could be used for each of three different process steps that are respectively comparable to steps (a), (b) and (c) in Applicant's Claim 1.

For each of the foregoing reasons, it is respectfully submitted that the embodiment shown in Figure 9 of Yeh does not disclose all of the elements that are recited in Claim 1. Accordingly, Yeh does not completely anticipate Claim 1 under §102. Notice to that effect is respectfully requested.

Independent Claim 1 -- §103 and Chen, Yeh and Yang

Independent Claim 1 is also rejected under 35 U.S.C. §103, on the theory that it would be obvious in view of a proposed combination of teachings from (1) Chen U.S. Patent No. 6,025,273, (2) Yeh U.S. Patent No. 6,207,565, and (3) Yang U.S. Patent No. 6,221,772. This ground of rejection is respectfully traversed. In this regard, the PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Chen, Yeh and Yang fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 1, for the following reasons.

THE PRIOR ART MUST TEACH ALL CLAIM LIMITATIONS UNDER §103

The provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations. (Emphasis added).

The PTO considers this requirement to be important, as evidenced by the fact that this exact language appears not only in MPEP §2142, but also in other sections of the MPEP, including MPEP §706.02(j) and MPEP §2143. As noted earlier, Applicants' Claim 1 recites:

- (a) performing an oxygen ashing step to remove said patterned photoresist layer;
 - (b) cleaning a residue from said opening by performing a halogen containing plasma step; and
 - (c) etching said substrate through said cleaned opening;
- wherein steps (a), (b), and (c) are performed in the same process chamber of said etching tool.

The Office Action admits (at lines 14-16 on page 3) that Chen does not disclose the use of a single process chamber to carry out three successive steps that are comparable to steps (a), (b) and (c) in Applicants' Claim 1. The Office Action therefore turns to the embodiment shown in Figure 6 of Yeh. In particular, the Office Action asserts that Figure 6 teaches use of a single process chamber to carry out three successive steps that are respectively comparable to steps (a), (b) and (c) in Applicants' Claim 1. However, this is not correct.

More specifically, referring to Table I in Figure 6, the Examiner's attention is respectfully directed to the row labeled "Gas 1: O₂ (sccm)", which shows the flow of oxygen used in five

successive steps represented by five columns in Table I that are respectively labeled "Step 1" through "Step 5". It will be noted that "Step 2" and "Step 3" do not use any oxygen, and do not constitute an oxygen ashing process. Instead, "Step 4" and "Step 5" each use oxygen, and constitute an oxygen ashing process. This is reinforced by the label in Figure 6 of Yeh, indicating that Table I shows "CF₄/H₂O plasma first" (which is a reference to Steps 2 and 3), and then "O₂ ash last" (which is a reference to Steps 4 and 5). Thus, steps 4 and 5 in Figure 6 constitute an oxygen ashing process used to remove a photoresist. As best understood, this is equivalent to the ashing process represented by block 904 in Figure 9 of Yeh. Step (a) in Applicants' Claim 1 recites "an oxygen ashing step". But after step (a), Claim 1 goes on to recite an additional step (b), followed by a further step (c), and then recites that steps (a), (b) and (c) are all carried out in the same process chamber. In contrast, Table I in Figure 6 of Yeh does not show any additional steps after the oxygen ashing process of steps 4 and 5. Consequently, there is no basis for the Examiner's assertion that Figure 6 of Yeh shows (1) steps that are equivalent to steps (b) and (c) of Applicants' Claim 1, and also (2) that a single process chamber is used to carry out successive steps that are respectively equivalent to steps (a), (b) and (c) in Claim 1. Consequently, since Figure 6 of Yeh fails to show process steps comparable to steps (b) and (c) of Applicants' Claim 1, there is no basis for the assertion in the Office Action that Figure 6 of Yeh shows the use of a single process chamber to carry out three successive process steps that are respectively comparable to steps (a), (b) and (c) of Applicants' Claim 1.

The Office Action then turns to Yang, stating that Yang teaches the use of a single process chamber for (1) an oxygen ashing step followed by (2) an etching step. As best understood, the Examiner considers these two steps to be respectively comparable to (1) the oxygen ashing recited in step (a) of Applicants' Claim 1, and (2) the etching recited in step (c) of Applicants' Claim 1. However, even the Office Action does not assert that, between Yang's ashing and etching steps, Yang could employ a halogen-containing plasma, much less that an ashing step, a halogen plasma step, and an etching step could all be successively carried out in the same process chamber.

Summarizing, the Office Action admits that Chen does not teach use of a single process chamber for three successive process steps that are respectively comparable to steps (a), (b) and (c) in Applicants' Claim 1. Moreover, Applicants respectfully submit that neither Yeh nor Yang teaches use of a single process chamber for three successive process steps that are respectively comparable to steps (a), (b) and (c) recited in Applicants' Claim 1. Accordingly, even if Chen is modified in view of either Yeh or Yang, as proposed by the Examiner, the result would not be the subject matter that is recited in Applicants' Claim 1. Claim 1 is therefore not rendered obvious under §103 by Chen, Yeh and Yang, and notice to that effect is respectfully requested.

Dependent Claims

Claims 2 and 5-10 depend from Claim 1, and are also believed to be distinct from the art of record, for example for the same reasons discussed above with respect to Claim 1.

Conclusion

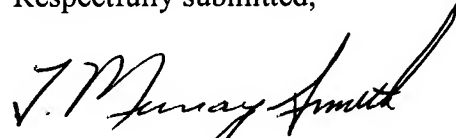
Based on the foregoing, it is respectfully submitted that all of the pending claims are fully allowable, and favorable reconsideration of this application is therefore respectfully requested. If the Examiner believes that examination of the present application may be advanced in any way by a telephone conference, the Examiner is invited to telephone the undersigned attorney at 972-739-8647.

Appl. No. 10/714,207
Reply to Office Action of June 1, 2007

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Although Applicants believe that no additional fees are due, the Commissioner is hereby authorized to charge any fee required by this paper, or to credit any overpayment, to Deposit Account No. 08-1394 of Haynes and Boone, LLP.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "T. Murray Smith", with a stylized flourish at the end.

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Enclosures: None

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